Mumbai University

QUESTION PAPER

April – 2017

[B.Sc.IT – SEMESTER: VI]
(CBSGS – 75:25 PATTERN)

- ❖ **INTERNET TECHNOLOGIES**
- ❖ **DIGITAL SIGNALS AND SYSTEMS**
- ❖ **DATA WAREHOUSING**
- ❖ **IPR AND CYBER LAWS**
- ❖ **PROJECT MANAGEMENT**
- ❖ **GEOGRAPHIC INFORMATION SYSTEMS**

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Question Paper

[CBSGS – 75:25 Pattern]
(April – 2017)

PAPER - I

INTERNET TECHNOLOGIES

Time: 2 ½ Hours

Total Marks: 75

N.B.: (1) *All Question are Compulsory.*
     (2) *Make Suitable Assumptions Wherever Necessary And State The Assumptions Made.*
     (3) *Answer To The Same Question Must Be Written Together.*
     (4) *Number To The Right Indicates Marks.*
     (5) *Draw Neat Labeled Diagrams Wherever Necessary.*
     (6) *Use of Non – Programmable Calculator is allowed.*

Q.1 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) What is fragmentation? Which fields changes over datagram during fragmentation in routing? Explain. **(5)**

(B) Explain Dual Stack and Tunneling in IPV6. **(5)**

(C) Explain the options in IPv4. **(5)**

(D) Compare IPV4 with IPV6. **(5)**

Q.2 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) What are the types of ICMP Error Messages? Explain. **(5)**

(B) Mobile IP communication can be Inefficient. Why? What is its Solution? Explain. **(5)**

(C) What is Address Resolution Protocol? What is its use? Explain the ARP Request and Reply Messages. **(5)**

(D) What are the different RIP Times? Explain the purpose of RIP Timers. **(5)**

Q.3 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) What are the services of TCP? Explain. **(5)**

(B) What is the concept of 3-Way Handshaking in TCP Connection establishment? Explain. **(5)**

(C) Compare TCP with UDP. **(5)**

(D) Explain the components of UDP package. **(5)**

Q.4 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Write a short note on DNS. **(5)**

(B) Explain SCTP association establishment and Termination. **(5)**

(C) Describe the DHCP Client Server Operations in the different Network. **(5)**

(D) What are the types of SCTP Chunks? Explain the meaning of each. **(5)**

Q.5 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Explain the term NVT along with its Character Set. **(5)**

(B) Explain the architecture of WWW. **(5)**

(C) List and explain the types of FTP Commands. **(5)**

(D) Describe the HTTP Messages. **(5)**

Q.6 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Explain video Compression in MPEG. **(5)**

(B) Write a short note on MIME. **(5)**

(C) What are the flow Characteristics of QOS? Explain. **(5)**

(D) Explain the following Protocols: POP, IMAP **(5)**

[TURN OVER]

Q.7 **ATTEMPT ANY THREE QUESTIONS: (15 MARKS)**

(A) Describe an IPV4 Datagram Header Format. **(5)**

(B) What are the types of OSPF Links? Explain. **(5)**

(C) Explain the Purpose of each TCP Timer. **(5)**

(D) Explain the Header Format of SCTP. **(5)**

(E) What are the types of Modes in TELNET? Explain. **(5)**

(F) Describe the Leaky Bucket Technique of Traffic Shaping. **(5)**

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[CBSGS – 75:25 Pattern]
(April – 2017)

PAPER - II

Digital

Signals and Systems

Time: 2 ½ Hours   **Total Marks:** 75

N.B.: (1) *All Question are Compulsory.*
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      (3) *Answer To The Same Question Must Be Written Together.*
      (4) *Number To The Right Indicates Marks.*
      (5) *Draw Neat Labeled Diagrams Wherever Necessary.*
      (6) *Use of Non – Programmable Calculator is allowed.*

Q.1 **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A) State and explain the properties of Unit Impulse Function (t). **(5)**

(B) How are Continuous and Discrete Time Systems classified? Explain. **(5)**
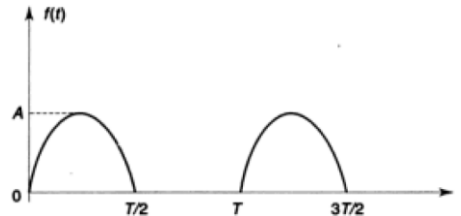
(C) What are Energy and Power Signals? **(5)**
Determine if the following signals are energy signals or power signals or neither:
    (i) $x(t) = tu(t)$
    (ii) $x(n) = (-0.5)^n u(n)$

(D) Obtain the Trigonometric Fourier series for the half wave rectified sine wave shown below: **(5)**
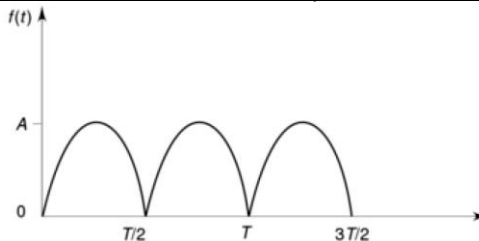

Q.2 **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A) Find the Laplace Transform of the following functions: **(5)**
    (i) $f(t) = \frac{1-e^t}{t}$
    (ii) $f(t) = cos^3 3t$

(B) Find the Laplace transform of the full wave rectified output as shown below: **(5)**

(C) Find the inverse Laplace transform of $\left\{\frac{S^2 - S - 3}{(S+5)(S+4)^2}\right\}$ **(5)**

(D) The unit step of a network is $(1 - e^{-at})$. Determine the impulse response $h(t)$ of the network. **(5)**

Q.3 **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A) A system has an impulse response $h(n) = \{1,2,3\}$ and output response **(5)**
$y(n) = \{1,1,2,-1,3\}$. Determine the input sequence $x(n)$.

(B) Determine the z-transform for the analog input signal $x(t) = e^{-at}$ applied to a Digital Filter. **(5)**

(C) How is z-transform obtained from Laplace Transform? Derive the z-transform of $f(nT) = cos\, \omega nT$ **(5)**

(D) Define one-sided z-Transform, Two-sided z-Transform and Inverse z-Transform. **(5)**

[TURN OVER]

Q.4 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Explain the Paley – Wiener criteria. **(5)**

(B) Consider a causal and stable LTI system whose input $x(n)$ and output $y(n)$ are related through the second order difference equation. $y(n) - \frac{1}{12}y(n-1) - \frac{1}{12}y(n-2) = x(n)$ **(5)**

Determine the step response for the system.

(C) Find the response of the following difference equation **(5)**
$$y(n) - 5y(n-1) + 6y(n-2) = x(n) \; for \; x(n) = u(n)$$

(D) A second order discrete time system is characterised by the difference equation **(5)**
$$y(n) - 0.1y(n-1) - 0.02y(n-2) = 2x(n) - x(n-1)$$
Determine y(n) for $n \geq 0$ when $x(n) = u(n)$ and the initial conditions are
$$y(-1) =- 10 \; and \; y(-2) = 5$$

Q.5 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Find the 4-point DFT of the sequence $x(n) = cos\frac{n\pi}{4}$. **(5)**

(B) Compute the circular periodic convolution graphically of the two sequences: **(5)**
$$x(n) = \delta(n) + \delta(n-1) - \delta(n-2) - \delta(n-3) \; and$$
$$h(n) = \delta(n) - \delta(n-2) + \delta(n-4)$$

(C) Determine the cross-correlation values of the two sequences $x(n) = \{1,0,0,1\}$ and $h(n) = \{4,3,2,1\}$. **(5)**

(D) Distinguish between linear convolution and circular convolution. **(5)**

Q.6 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Design a digital Chebyshev filter to satisfy the constrains **(5)**
$$0.707 \leq \left|H(e^{j\omega})\right| \leq 1, \qquad 0 \leq \omega \leq 0.2\pi$$
$$\left|H(e)^{j\omega}\right| \leq 0.1, \qquad 0.5\pi \leq \omega \leq \pi$$
Using bilinear transformation and assuming $T = 1s$.

(B) Design a Finite Impulse Response low pass filter with a cut-off frequency of $1kHz$ and sampling rate of 4kHz with eleven samples using Fourier series. **(5)**

(C) An analog filter has the following system function. Convert this filter into a digital filter using backward difference for the derivative. **(5)**
$$H(s) = \frac{1}{(s + 0.1)^2 + 9}$$

(D) Design a digital Chebyshev filter to satisfy the constrains **(5)**
$$0.707 \leq \left|H(e^{j\omega})\right| \leq 1, \qquad 0 \leq \omega \leq 0.2\pi$$
$$\left|H(e)^{j\omega}\right| \leq 0.1, \qquad 0.5\pi \leq \omega \leq \pi$$
Using bilinear transformation and assuming $T = 1s$.

[TURN OVER]

Q.7 **ATTEMPT ANY THREE QUESTIONS: (15 MARKS)**

(A) Write a short note on Dirichlet's conditions. **(5)**

(B) In the parallel RLC circuit. $I_0 = 5$ A, L = 0.2 H, C = 2 F And $R = 0.5 \, \Omega$. Switch S is opened at time $t = 0$. Obtain the complete particular solution for the voltage $v(t)$ across the parallel network. Assume zero current through inductor L and zero voltage across capacitor C before switching. **(5)**

(C) Convolve the sequences $x(n)$ and $h(n)$ where **(5)**
$x(n) = 0, n < 0$
$\quad\quad = a^n, n \geq 0$
$h(n) = 0, n < 0$
$\quad\quad = b^n, n \geq 0$
Specify the answers if **(i)** $a = b$ and **(ii)** $a \neq b$

(D) Find the convolution of the two signals **(5)**
$$x(n) = u(n) \; and \; h(n) = a^n u(n), \text{ROC}: |a| < 1; n \geq 0$$

(E) Find the circular periodic convolution using DFT and IDFT of the two sequences: **(5)**
$$x(n) = \{1,1,2,2\} \; and \; h(n) = \{1,2,3,4\}$$

(F) Design an analog BPF to satisfy the following specifications: **(5)**
  (i) *3 dB upper and lower cut-off frequencies are 100 Hz and 3.8 kHz*
  (ii) *Stop band attenuation of 20 dB at 20 Hz and 8 kHz.*
  (iii) *No ripple with both passband and stopband.*

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[CBSGS – 75:25 Pattern]
(April – 2017)

Paper - III

Data

Warehousing

Time: 2 ½ Hours

Total Marks: 75

N.B.: **(1)** *All Question are Compulsory.*
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    (3) *Answer To The Same Question Must Be Written Together.*
    (4) *Number To The Right Indicates Marks.*
    (5) *Draw Neat Labeled Diagrams Wherever Necessary.*
    (6) *Use of Non – Programmable Calculator is allowed.*

Q.1   **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A)   What are the characteristics of a Data Warehouse?   **(5)**
(B)   Differentiate OLTP and OLAP.   **(5)**
(C)   Explain the different types of facts in a fact table with suitable examples.   **(5)**
(D)   Differentiate Star and Snowflake Schema with respect to Data Warehouse.   **(5)**

Q.2   **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A)   Why is it necessary to configure a listener before creating the Database? Explain the steps to configure a listener.   **(5)**
(B)   What are the different components of OWB? Illustrate the same with a neat diagram.   **(5)**
(C)   Explain the three windows in the OWB Design Center.   **(5)**
(D)   What is the role of a DSN? What are the steps involved in configuring a DSN?   **(5)**

Q.3   **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A)   Why is it necessary to create a target user and a target module while designing a DW in OWB?   **(5)**
(B)   Differentiate Relational and Multidimensional implementation of a Dimensional Model in a Database.   **(5)**
(C)   Why Time Dimension is considered a key part of most Data Warehouses? Explain the different characteristics of a dimension that has to be defined in an OWB.   **(5)**
(D)   What are the Cube Details that can be seen for a cube in the Data Object Editor?   **(5)**

Q.4   **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A)   What is the significance of ETL while creating a Data Warehouse in OWB? How is this accomplished in OWB?   **(5)**
(B)   Explain how an Aggregator data flow operator is used in mapping between sources and targets in OWB.   **(5)**
(C)   Discuss in detail the constraints tab in the Data Object Editor in OWB.   **(5)**
(D)   What is the role of a Joiner data flow operator in mapping sources and targets in OWB?   **(5)**

Q.5   **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A)   Explain any three transformations operator in OWB.   **(5)**
(B)   Why is a Key Lookup operator necessary in a mapping in OWB?   **(5)**
(C)   Why is it important to validate the objects in a Design Center? What are the possible results after validation process?   **(5)**
(D)   What are the default operating modes the mapping code can run in when executing in the database?   **(5)**

Q.6   **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A)   What is the significance of Snapshot in OWB?   **(5)**
(B)   Why is it necessary to synchronize objects in OWB?   **(5)**
(C)   Explain the terms Data Sparsity and Data Explosion with respect to a Data warehouse.   **(5)**
(D)   Explain with a neat diagram the basic OLAP System Architecture.   **(5)**

[TURN OVER]

Q.7 **ATTEMPT ANY THREE QUESTIONS: (15 MARKS)**

(A)	Explain Slowly Changing Dimension with a suitable example.	**(5)**
(B)	What are the steps involved in configuring repository and workspaces in OWB?	**(5)**
(C)	What are the Dimension Details that can be seen in the Data Object Editor?	**(5)**
(D)	List the properties seen in the property window of Aggregator operator.	**(5)**
(E)	Explain the columns in Object Details window under the Control Center Manager window in OWB.	**(5)**
(F)	What is the role of Recycle Bin in OWB? Explain.	**(5)**

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PAPER - IV

ELECTIVE

IPR AND

CYBER LAWS

Time: 2 ½ Hours   **Total Marks:** 75

N.B.: (1) *All Question are Compulsory.*
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    (5) *Draw Neat Labeled Diagrams Wherever Necessary.*
    (6) *Use of Non – Programmable Calculator is allowed.*

Q.1 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) What is the objective behind Patent Law? Explain.   **(5)**
(B) What are the contents of Patent Specification?   **(5)**
(C) Enumerate the basic Principles of Trademark.   **(5)**
(D) Discuss "International Background of Intellectual Property Rights".   **(5)**

Q.2 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Explain Data Protection Act in detail.   **(5)**
(B) Write a short note on Agreement on Trade-Related Aspects of Intellectual Property Rights.   **(5)**
(C) Explain the concept of Semi-Conductors. State and explain Semiconductor IC Layout Design Act.   **(5)**
(D) What do you mean by Domain Name and disputes in Domain Name?   **(5)**

Q.3 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Discuss transfer of Patent Rights in the form of assignment.   **(5)**
(B) Explain "Copyright is protection in form & not in idea".   **(5)**
(C) What are the defences available in case of infringement of trademarks and design?   **(5)**
(D) What is a Trademark? What are its Essential Elements? What are its Functions?   **(5)**

Q.4 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) What are General Obligations for enforcement of Intellectual Property Rights?   **(5)**
(B) What are different types of IP Licensing Formats?   **(5)**
(C) What is Licensing Agreement? List its different types.   **(5)**
(D) Discuss Civil and Criminal Remedies in enforcing Intellectual Property Rights.   **(5)**

Q.5 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Describe implementation of Cyber Law in India.   **(5)**
(B) What is Digital Contract? Explain.   **(5)**
(C) What are the different issues in the Cyber World?   **(5)**
(D) Explain Copyright issue in India? Explain Copyright in WWW.   **(5)**

Q.6 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) What are the objectives of IT Act, 2000?   **(5)**
(B) What does a Certifying Authority certify, while issuing the Digital Signature Certificate?   **(5)**
(C) Discuss the Malaysian Approach to Cyber Laws?   **(5)**
(D) What does Chapter 9 of IT Act, 2000, "Penalties and Adjudication" cover?   **(5)**

[TURN OVER]

Q.7 ATTEMPT ANY THREE QUESTIONS: (15 MARKS)

(A)	List the main features of Copyright Act of 1957.	**(5)**
(B)	Write a short note on WIPO Treaty.	**(5)**
(C)	Define Copyright. Explain different rights conferred by Copyright.	**(5)**
(D)	Discuss on "Border Security Measures".	**(5)**
(E)	Explain the conditions for applying Digital Signature.	**(5)**
(F)	What are the conditions under which Intermediary Gets Exemption from Liability?	**(5)**

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<u>Question Paper</u>

[CBSGS – 75:25 Pattern]
(April – 2017)

PAPER - IV

ELECTIVE

PROJECT

MANAGEMENT

Time: 2 ½ Hours

Total Marks: 75

N.B.: **(1)** *All Question are Compulsory.*
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    (6) *Use of Non – Programmable Calculator is allowed.*

Q.1 **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A) Explain the five basic Parameters of the Software Cost Model. **(5)**
(B) Explain the drawbacks of Waterfall Model. **(5)**
(C) How software size can be reduced? Explain. How software size can be reduced? Explain. **(5)**
(D) How peer inspection helps in improving returns on investment? Explain. **(5)**

Q.2 **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A) Summarize differences, in emphasis on different life cycle aspects, between the two Life Cycle Stages. **(5)**
(B) Explain "Elaboration Phase" of the Life Cycle. **(5)**
(C) List all the five artifact sets. Explain Release Specification. **(5)**
(D) Discuss Technical perspective of Software Architecture. **(5)**

Q.3 **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A) Write a short note on Major Milestones. **(5)**
(B) Define WBS. Explain Evolutionary Work Break Down Structures. **(5)**
(C) Explain the Iteration Planning Process. **(5)**
(D) Summarize the Life Cycle Emphasis associated with each Workflow. **(5)**

Q.4 **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A) Define Organizational Structure. What is a Line of Business Organization? Briefly explain main features of default Line of Business Organization. **(5)**
(B) Discuss various change categories defined on the basis of causes of change. Allocate the appropriate change category to the following changes: **(5)**
    (i) *Port to New Platform*
    (ii) *Loss of User Data*
    (iii) *Use of colours to differentiate updates from the previous version*
    (iv) *Browser expands but doesn't collapse displayed entries*
    (v) *Upgradation to improve Query Performance*
(C) Explain Mapping between Process Workflows and Software Development Tools. **(5)**
(D) How the Teams Gravity shifts over the Life Cycle? Explain. **(5)**

Q.5 **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A) Define Metrics. Explain 7 Core Metrics. **(5)**
(B) Discuss the basic characteristics of Good Metrics. **(5)**
(C) Explain SPCP (Software Project Control Panel). **(5)**
(D) What do you mean by "Tailoring the Process"? Explain the dimensions of discriminating factors for tailoring the process. **(5)**

[TURN OVER]

Q.6 ATTEMPT ANY TWO QUESTIONS: (10 Marks)

(A) How Modern Process Framework Exploits several Critical Approaches for resolving the five recurring issues of the Conventional Process. **(5)**

(B) Discuss the Software Management Best Practices. **(5)**

(C) Discuss the two major improvements expected in the Next Generation Cost Models. **(5)**

(D) Discuss the Culture Shifts necessary for the transition to Modern Software Process. **(5)**

Q.7 ATTEMPT ANY THREE QUESTIONS: (15 Marks)

(A) Discuss important trends in improving Software Economics. **(5)**

(B) Give difference between Software Architecture and Design. **(5)**

(C) Discuss issues related to Conventional WBS. **(5)**

(D) Write a short note on SCO. **(5)**

(E) Explain EVS (Earned Value System). **(5)**

(F) Summarize the balanced application of modern principles to achieve Economic results. **(5)**

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<u>Question Paper</u>

[CBSGS – 75:25 Pattern] (April – 2017)

PAPER - IV

ELECTIVE

GEOGRAPHIC INFORMATION SYSTEM

Time: 2 ½ Hours   **Total Marks:** 75

N.B.: **(1)** *All Question are Compulsory.*
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    (6) *Use of Non – Programmable Calculator is allowed.*

Q.1   ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) List and explain GIS Operations related to Data Analysis. (5)
(B) Write a short note on Rasterization. (5)
(C) Explain the Universe Transverse Mercator (UTM) Grid System. Give suitable example. (5)
(D) Explain the following terms of Object Based Data Model and give suitable example: (5)
    (i) *Aggregation*
    (ii) *Association*

Q.2   ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) What is Root Mean Square Error in Geometric Transformation? Explain the role of RMS error in Affine Transformation. (5)
(B) Explain the Map-To-Map and Image-To-Map Transformation. (5)
(C) List the Common Resampling Methods and explain them. (5)
(D) Explain the Bilinear Interpolation Resampling Method with suitable example. (5)

Q.3   ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Explain different types of attribute table. (5)
(B) Explain File and Hierarchical Database with suitable example. (5)
(C) Explain: (5)
    (i) *Dot Map*
    (ii) *Choropleth Map*
(D) Explain Relational Database with suitable example. (5)

Aspect

3	2	1	1	1	2	2	2
2	3	3	3	3	3	1	1
1	2	3	3	2	1	1	3
2	2	3	1	1	1	2	2
2	2	2	1	1	1	1	1
3	2	2	1	2	1	2	3
3	2	3	3	3	2	2	3
2	2	2	1	3	1	3	3

Slope

1	2	2	2	1	1	1	2
2	3	1	1	2	2	1	1
1	2	3	3	2	1	1	3
2	2	3	1	1	1	2	2
2	2	2	1	1	3	3	1
3	1	2	1	1	1	2	3
3	1	3	3	1	2	2	3
1	1	1	2	3	2	3	3

Q.4   ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Explain Buffering. (5)
(B) List and explain various Overlay Operations based on feature type. (5)
(C) Explain the following Map Manipulation Operations with example: (5)
    (i) *Dissolve*
    (ii) *Append*
(D) Explain the Reclassification Local Operation of Raster. (5)

[TURN OVER]

Q.5 **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A) Explain Buffering. **(5)**

(B) List and explain various Overlay Operations based on feature type. **(5)**

(C) Explain the following Map Manipulation Operations with example: **(5)**
  (iii) *Dissolve*
  (iv) *Append*

(D) Explain the Reclassification Local Operation of Raster. **(5)**

Q.6 **ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

(A) List and explain the types of Spatial Interpolation. **(5)**

(B) Explain the Density Estimation local method. **(5)**

(C) What is Kriging? Explain. **(5)**

(D) Define following: **(5)**
  (i) *Anisotrophy*
  (ii) *Range*
  (iii) *Nugget*
  (iv) *Partial Sill*
  (v) *Sill*

Q.7 **ATTEMPT ANY THREE QUESTIONS: (15 MARKS)**

(A) Explain the different components of GIS. **(5)**

(B) Write a short note on metadata. **(5)**

(C) Explain normalization with suitable example. **(5)**

(D) Write a short note on feature selection by graphic data query. **(5)**

(E) Find the zonal mean for the input raster(a) using a zonal raster(b) **(5)**

2	7	1	1
9	8	5	3
2	8	4	6
1	4	5	3

(a)

1	1	1	2
1	1	1	2
3	3	2	2
3	3	3	3

(b)

(F) Describe how Semivariance can be used to qualify the spatial dependence in a Data Asset. **(5)**